DRAFT

Sustainable Soil and Water Quality Practices on Forest Land





Michigan Department of Natural Resources

Michigan Department of Environmental Quality

IC 4011 (Rev. 04/05/2007)

MICHIGAN DEPARTMENT OF NATURAL RESOURCES MISSION STATEMENT

"The Michigan Department of Natural Resources is committed to the conservation, protection, management, use and enjoyment of the State's natural resources for current and future generations."

NATURAL RESOURCES COMMISSION STATEMENT

The Natural Resources Commission, as the governing body for the Michigan Department of Natural Resources, provides a strategic framework for the DNR to effectively manage your resources. The NRC holds monthly, public meetings throughout Michigan, working closely with its constituencies in establishing and improving natural resources management policy.

This information is available in alternative formats.

Printed By Authority of: The Michigan Department of Natural Resources

Total Number Of Copies Printed 2,000 Total Cost: \$ Cost Per Copy: \$

FOREWORD

Dear Reader and User:

This is the first substantial revision of the "Water Quality Practices on Forest Land", also known as Michigan's Forestry Best Management Practices (BMP) Manual. The original was published in 1994 with several re-printings and minor changes to adjust for governmental reorganization and re-codification of environmental and natural resource protection laws.

A key influence in revising the original manual has been the development of forest certification standards. These standards emphasize sustainable forestry principles and practices which include protection of water and soil resources. In the United States, there are two primary forest certification systems: The Sustainable Forestry Initiative (SFI), developed by the American Forest and Paper Association, and the set of standards developed by the Forest Stewardship Council (FSC).

The scope and use of the term "Best Management Practices" (BMPs) has been expanded in this manual. This manual uses "BMPs" in the context as those practices that not only protect surface water quality, but soil quality too. Two new sections have been added: 1) The forest wetland protection practices to use when constructing roads, and 2) guidelines to address rutting. The term "buffer strip" has been changed to "Riparian Management Zone" (RMZ). This term provides a more accurate description regarding the activities allowed in the forested area adjacent to a stream or other water body. Forest management activities are allowed, provided extra precaution is used and the integrity and function of the RMZ is maintained during and after forest management activities (i.e. logging) are completed.

Please note that the BMPs described in previous editions are incorporated into this manual. The specifications have not been changed nor have the statutes governing them.

From a legal standpoint, the use of these BMPs is voluntary. However, properly applying these practices enables the responsible party or parties to meet pertinent environmental protection regulations. Voluntarily applying these practices will, under most weather conditions, prevent sediment or other non-point sources to go into a stream or other open water body.

This manual describes the specifications and techniques to properly apply voluntary BMPs. It also provides information regarding environmental laws and regulations that may apply when forest management activities occur.

This manual provides recommended guidelines and specifications. It does not cover all situations, as conditions vary from site to site. There is room for latitude, and these practices may be modified for specific site conditions to protect soil and site productivity, and water quality resources.

Table of Contents

1. INTRODUCTION	
2. LAWS AND PERMITS	5
Stream Crossings	5
Soil Erosion and Sedimentation Control Regulations	6
Wetlands and Floodplains	
Other Laws Affecting Forest Management	
3. FUELS, LUBRICANTS AND SPILLS	
Spill Prevention Best Management Practices	9
Spills	
4. TIMBER HARVEST PLANNING	10
Pre-Harvest Planning	
5. RIPARIAN MANAGEMENT ZONES (RMZs)	
Forest Management Activities within the Riparian Management Zone	12
Site Specific Factors to Consider	13
Riparian Management Zone Water Quality Function Factors	
Riparian Management Zone Widths	
Designated Trout Streams and Management Within the Riparian Management Zone	
Management for Shade Intolerant Species within the RMZ	
Natural River Regulations and RMZs	
Wild and Scenic Rivers	
6. FOREST ROADS	
Planning and Forest Road Placement	
Reducing Water Volume and Velocity on the Forest Road System	
Road Grades	
BMP Specifications for Construction for Protection of Water Quality	
Road Management Measures for Permanent and Temporary Roads	
Winter Roads	
Road Closure and Retirement	
7. WATER DIVERSION DEVICES	
Earth Berm Water Bars	
Conveyor Belt Water Bars	
Temporary Water Bars Made from Slash or Logs	
Broad-Based Dips	
Diversion Ditches	
Cross Drainage Culverts	
8. STREAM CROSSINGS	
Temporary Bridges	
Crossing Streams Using Culverts	
Culvert Installation and Placement	
Guidelines Regarding The Application of The Mesboa Method Based on Stream Channel W	
And Culvert Diameter	
9. RUTTING	
10. LANDINGS	
11. SKIDDING	
12. WETLAND BMPS AND FOREST ROADS	
Forest Road Construction in Forested Wetlands	
BMP Specifications for Forest Road Construction on Organic Wetland Soils	
Specifications for Roads Constructed on Mineral Soils or a Thin Organic Layer	
13. FOREST ROADS - CONTROLLING SEDIMENT MOVEMENT AND TRANSPORT DURING RA	
EVENTS	
Brush Barriers	
Silt Fence	
Riprap	
14. SITE PREPARATION, REFORESTATION AND FOREST PROTECTION	
Mechanical Preparations	47
Prescribed Burning	
Chemical Treatment	

Reforestation	49
Use of Pesticides	49
Wildfire Damage Control and Reclamation	50
APPENDIX A - GLOSSARY	
APPENDIX B - WORKING WITHIN THE LAWS GOVERNING NONPOINT SOURCE POLLUTION	
APPENDIX C - LIST OF APPLICABLE LAWS IN MICHIGAN	56
APPENDIX D - FREQUENTLY ASKED QUESTIONS REGARDING STREAM CROSSING	
REGULATIONS AND PERMITS	59
APPENDIX E – VEGETATIVE EROSION CONTROL GUIDELINES FOR NATURAL RESOURCE	
MANAGEMENT	60
REFERENCES	67
Index of Figures	
_	
Figure 1. Pre-Harvest Site and BMP Plan Map	11
Figure 2. Example of a Riparian Management Zone	
Figure 3. An Example of a Knuckleboom Harvester.	
Figure 4. BMP Construction Road Techniques Based on Slope and Soils.	
Figure 5. Proper Installation of a Silt Fence.	
Figure 6. Earth Berm Water Bar Construction.	25
Figure 7. A Conveyor Belt Water Bar.	
Figure 8. Illustration of a Water Bar Made of Slash.	
Figure 9. Broad-based Dip.	
Figure 10. Diversion Ditch	
Figure 11. Cross-Drainage Culvert.	
Figure 12. Example of a Wooden Portable Bridge	32
Figure 13. Example of a Portable Folding Metal Bridge	
Figure 14. Culvert Installation Without Change in Stream Bottom Elevation	
Figure 15. Illustrations and Instructions for Installation of a Stream Crossing Culvert	
Figure 16. Illustration of Proper Use of Riprap & Geotextile Around Inlet of Stream Crossing Culverts	
Figure 17. Measuring Bankfull Width	
Figure 18. Forest Road Rutting Damage	
Figure 19. Wheeled Harvester/Processor with Bogey Tracks	31
Figure 20. Example of Empheral DrawError! Bookmark not defi	40
Figure 21. Proper Culvert Installation and Use on a Wetland Road.	
Figure 22. Porous Road Design Using Large Stone	
Figure 23. Illustration of Use and Placement of Culverts and Ditches for Wetland Roads	44
Figure 24. Cross Sectional Views of a Check Dam.	45
Figure 25. Check Dam Spacing.	
rigure 20. Officer Dam Opacing.	+0
Index of Tables	
Table 1. Riparian Management Zone Width Adjusted for Slope.	15
Table 2. Soil Erosion Susceptibility.	
Table 3. Water Bar Spacing Intervals	
Table 4. Spacing for Broad-Based Dips	
Table 5. Rutting Guidelines	
<u> </u>	